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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MIKKO SIEVANEN,
JONI HIETALA, and PENTTI JARVELA

Appeal 2008-002547
Application 09/868,244
Technology Center 3700

Decided: August 4, 2009

Before DEMETRA J. MILLS, ERIC GRIMES, and FRANCISCO C.
PRATS, *Administrative Patent Judges*.

PRATS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a bowling lane and a sectional element for constructing the bowling lane. The Examiner has rejected the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

STATEMENT OF THE CASE

The Specification discloses a sectional element for constructing bowling lanes that is “light, cheap and . . . can be easily disassembled, assembled and transferred, wherein it also possesses resale value. It endures humidity and temperature changes better than known bowling lane constructions” (Spec. 3).

Appellants’ Figure 1, reproduced below, is a side view of the element:

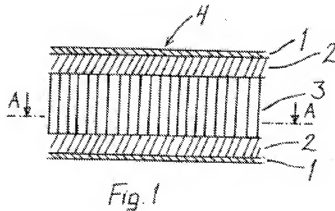


Figure 1 shows bowling lane element 4, “formed of a laminate layer 1, a board layer 2, and a supporting structure layer 3. In the example, the laminate layer 1 is a high pressure laminate, the board layer 2 is a wood-based board and the supporting structure layer 3 is a cellular board” (Spec. 4). To form the actual bowling lane, “[a]djacent bowling lane elements 4 are fixed on top of the substructure . . . to form a single uniform board layer” (*id.* at 5).

Appellants’ Figure 2, reproduced below, “shows the structure of a cellular board in a cross-section A-A of Fig. 1” (*id.*):

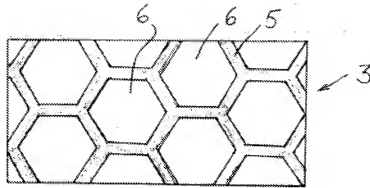


Fig. 2

Figure 2 shows cellular board 3 “composed of a wall 5 which separates cells 6 which are attached to each other wall to wall. The wall 5 is made of aluminum. . . . By means of the honeycomb structure it is possible to attain substantially equal strength properties irrespective of the direction” (*id.*).

Claims 12-22 and 24-29 stand finally rejected and are on appeal (App. Br. 3).¹ Claims 26, 28, and 29, the independent claims, are representative and read as follows:

26. A sectional bowling lane, comprising:
a substructure comprising beams; and
a plurality of construction elements arranged on top of the substructure, each construction element comprising at least one supporting structure layer comprising a cellular board including a plurality of cells each having a longitudinal axis extending in a direction perpendicular to the cellular board, an impact stress enduring board layer attached to opposite sides of the supporting structure layer, and a bowling surface comprising at least one impact-resistant laminate layer attached

¹ Appeal Brief filed September 29, 2006.

to the board layer on at least one side of the supporting structure layer,

wherein the construction elements are operatively connected to each other.

28. A construction element for a sectional bowling lane, the construction element comprising:

at least one supporting structure layer comprising a cellular board including a plurality of cells each having a longitudinal axis extending in a direction perpendicular to the cellular board;

an impact stress enduring board layer attached to opposite sides of the supporting structure layer; and

a bowling surface comprising at least one impact resistant laminate layer attached to the board layer on at least one side of the supporting structure layer;

wherein the construction element is configured to be operatively connectable to at least one other construction element.

29. A construction element for a sectional bowling lane, the construction element comprising:

at least one supporting structure layer comprising a cellular board including a plurality of cells, each cell including a plurality of walls substantially traverse to the supporting structure layer;

a board layer having a thickness between 5 and 30 millimetres and a density over 1000 kg/m^3 attached to opposite sides of the supporting structure layer; and

at least one laminate layer attached with an adhesive medium to the board layer on at least one side of the supporting structure layer;

wherein the construction element is configured to be operatively connectable to at least one other construction element.

The Examiner cites the following documents as evidence of unpatentability:

Lorber ²	US 3,586,325	Jun. 22, 1971
Brunst	US 4,320,898	Mar. 23, 1982
Kelly	US 4,337,290	Jun. 29, 1982
Gorges	US 4,557,961	Dec. 10, 1985
Turner	US 5,106,668	Apr. 21, 1992
Stirling	US RE 35,778	Apr. 28, 1998

WILLIAM D. CALLISTER, MATERIALS SCIENCE AND ENGINEERING 541-42 (New York: John Wiley & Sons, Inc., 1997).

The following rejections are before us for review:

Claims 12-17, 19-22, and 24-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gorges and Materials Science (Ans. 3-5).

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gorges, Materials Science, and Kelly (Ans. 5-6).

Claims 17-22 and 24-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst and Kelly (Ans. 6).

Claims 12-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst, Kelly, Stirling, Materials Science, and Turner (Ans. 6-7).

Claims 15 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst, Kelly, Stirling, Materials Science, and Gorges (Ans. 7).

OBVIOUSNESS -- GORGES AND MATERIALS SCIENCE
ISSUE

² While not cited in the “Evidence Relied Upon” section of the Examiner’s Answer, the Examiner cites Lorber to rebut certain arguments made by Appellants (*see* Ans. 3, 8).

The Examiner cites Gorges as disclosing a “structural panel to be put to use in any environment (abstract, ln. 19), particularly useful as a flooring structure” (Ans. 3). The Examiner notes that Gorges’ panel includes “a cellular board 14, an impact stress [e]nduring layer 15 and an ‘impact-resistant’ laminate layer 20” (*id.* at 4). The Examiner also notes that, “[a]s shown in fig. 4, the elements of Gorges are connected together” (*id.*).

Regarding the recitation in the preamble of claim 26 requiring the claimed structure to be “[a] sectional bowling lane,” the Examiner urges that “any floor is considered to meet this recitation of intended use. Most broadly, plastic toy pins and a ball used by a child on a floor render such a ‘bowling lane’” (*id.* at 4). For similar reasons, the Examiner contends that the surface of Gorges’ panel meets the limitation in claim 28 requiring the claimed constructional element to have a “bowling surface” (*id.*)

The Examiner cites Materials Science as teaching the use of wood and adhesive in panels of the type disclosed by Gorges (*see id.* at 4-5). Based on Gorges’ teachings that the properties of its panels may be varied depending on the intended application, the “thickness and density [recited in claim 29] would have been obvious as the selection of materials for an intended use” (*id.* at 5).

Appellants contend that the Examiner erred in concluding that claims 26, 28, and 29 are indistinguishable from any horizontal floor, as evidenced by the fact that the international patent classification system recognizes that “the concept of the bowling lane (alley) is very specific” (App. Br. 9). Appellants contend that an ordinary artisan would not have considered the fire retardant coating of Gorges’ structural panels to be a laminate (*id.* at 10

(citing Merriam-Webster Online Dictionary)), or an impact resistant bowling surface (*id.* at 11).

Moreover, Appellants contend, Gorges “does not disclose an impact stress enduring board layer. Rather, Gorges discloses a face sheet 15 that is a fibrous material impregnated with phenolic resin so as to enhance the fire resistance characteristics of the panel” (*id.* at 11).

Appellants further contend that Materials Science “does not overcome any of the above-discussed deficiencies of Gorges” (*id.*). Appellants also contend that the Examiner failed to provide an adequate rationale for combining Gorges and Materials Science (*id.* at 11-12 (citing MPEP § 2142)).

In view of the arguments advanced by Appellants and the Examiner, the issues with respect to this rejection are whether the Examiner erred in concluding that claim 26 encompasses Gorges’ structural panels, and whether the Examiner erred in concluding that Gorges meets the limitations in claim 28 requiring the construction element to have “an impact stress enduring board layer attached to opposite sides of the supporting structure layer,” and “a bowling surface comprising at least one impact resistant laminate layer attached to the board layer on at least one side of the supporting structure layer.”

FINDINGS OF FACT (“FF”)

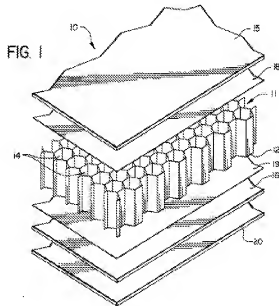
1. The Specification states that “[t]he bowling lane is composed of an approach, a ball track and a pin deck. Different parts of the bowling lane require different qualities, which have to be taken into account when the lane is designed” (Spec. 1). Thus, “[b]y the approach, the lane has to endure e.g. the weight of the bowler, and as far as the ball track and the pin deck are

concerned, impact resistance and the friction on the surface of the lane are important features” (*id.*).

2. Gorges discloses “[c]omposite, lightweight, fire-retardant laminar structural panel elements . . . which are particularly, but not exclusively, suitable for use as interior floor and/or bulkhead panels in aircraft--especially, commercial aircraft--ships, submarines and the like” (Gorges, col. 3, ll. 43-47).

3. Gorges discloses that the panels are “characterized by their high resistance to fire and/or heat, lightness in weight, strength and/or durability” (*id.* at col. 4, ll. 26-28).

4. Figure 1 of Gorges, reproduced below, “is a fragmentary, exploded, perspective view of a portion of a composite, laminar, lightweight, fire-resistant structural panel embodying features” of Gorges’ invention (*id.* at col. 4, ll. 63-65):



Gorges’ Figure 1 shows:

[P]anel 10 . . . provided with a central honeycomb core, generally indicated at 11, defined by interlaced and/or interconnected upright spacer elements 12 and expanded into an hexagonal honeycomb structure defining a plurality of closely spaced nodules or cells 14. Upper and lower laminar face sheets 15, 16, respectively, are adhesively bonded to the honeycomb core 11 by means of upper and lower phenolic adhesive films 18, 19, respectively.

(*Id.* at col. 5, ll. 35-43.)

5. Gorges' Figure 1 also shows:

[T]he composite, laminar panel 10 is provided with a fire-retardant coating 20 preferably formed of a copolymer of vinylidene fluoride and hexafluoropropene applied to at least the exposed surface of the lower face sheet 16, thus serving as an additional fire-retardant or resistant layer which is intended to be located on the side of panel 10 most closely proximate a potential fire hazard.

(*Id.* at col. 5, ll. 43-50.)

6. Gorges discloses that upper and lower face sheets 15 and 16 are made of a "fibrous material impregnated with a phenolic resin so as to further enhance the fire resistance characteristics of the panel 10. While acceptable results have been attained using fiberglass materials impregnated with phenolic resin, even more satisfactory results have been attained utilizing graphite fibers impregnated with phenolic resin" (*id.* at col. 6, ll. 36-42).

7. Gorges discloses that its panels can be connected together to create a floor for a commercial aircraft by appropriately locating panels with higher and lower load bearing capacities in floor sections that experience higher and lower foot traffic (*see id.* at col. 7, ll. 39-65; *see also* Fig. 4).

8. Materials Science and Engineering discloses that "sandwich panels" are structural composites which consist of "two strong outer sheets, or faces,

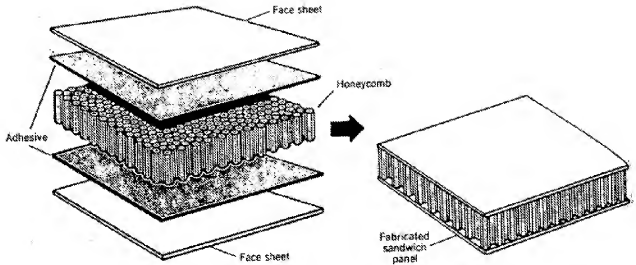
separated by a layer of less-dense material, or core, which has lower stiffness and lower strength. The faces bear most of the in-plane loading, and also any transverse bending stresses. Typical face materials include aluminum alloys, fiber-reinforced plastics, titanium, steel, and plywood” (Materials Science 541).

9. Materials Science discloses that “[s]andwich panels are found in a wide variety of applications; they include roofs, floors, and walls of buildings; and, in aircraft, for wings, fuselage, and tailplane skins” (*id.* at 542).

10. Materials Science discloses that the sandwich panel core “serves two functions. First, it separates the faces and resists deformations perpendicular to the face plane. Secondly, it provides a certain degree of shear rigidity along planes which are perpendicular to the faces” (*id.*).

10. Materials Science discloses that one popular core material “consists of a ‘honeycomb’ structure--thin foils that have been formed into interlocking hexagonal cells, with axes oriented perpendicular to the face planes. The material of which the honeycomb is made may be similar to the face material” (*id.*).

11. Figure 17.16 of Materials Science, reproduced below, is a “[s]chematic diagram showing the construction of a a honeycomb core sandwich panel” (*id.*):



The Figure shows “shows a cutaway view of a honeycomb core sandwich panel” (*id.*).

PRINCIPLES OF LAW

As stated in *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992):

[T]he examiner bears the initial burden . . . of presenting a *prima facie* case of unpatentability. . . . After evidence or argument is submitted by the [A]pplicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.

During examination the PTO must interpret terms in a claim using “the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the [A]pplicant’s [S]pecification.” *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997).

The Examiner must therefore “determine[] the scope of claims in patent applications *not solely on the basis of the claim language*, but upon giving claims their broadest reasonable construction ‘in light of the [S]pecification as it would be interpreted by one of ordinary skill in the art.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed.Cir.2005) (emphasis added) (quoting *In re American Academy Of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

Accordingly, “[c]laims are not to be read in a vacuum[;] while it is true they are to be given the broadest reasonable interpretation during prosecution, their terms still have to be given the meaning called for by the [S]pecification of which they form a part.” *In re Royka*, 490 F.2d 981, 984 (CCPA 1974).

“It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable.” *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

Thus, functional limitations directed to intended uses in an apparatus claim do not serve to distinguish the claimed apparatus from a prior art apparatus inherently capable of performing the claimed function. *See id.* at 1478-79 (holding that a prior art apparatus meeting all claimed structural limitations was anticipatory because it was inherently capable of performing the claimed function); *see also In re Swinehart*, 439 F.2d 210, 213 (CCPA 1971) (“‘Functional’ terminology may render a claim quite broad . . . [;] a claim employing such language covers *any and all* embodiments which perform the recited function.”).

Moreover, when the Examiner has a reasonable basis for concluding that the prior art meets a functional limitation, Appellants have the burden of showing that the limitation is not met. *See Schreiber*, 128 F.3d at 1478.

ANALYSIS

We agree with Appellants that the Examiner erred in finding that claim 26 encompasses Gorges' structural panels. Specifically, claim 26 states that the claimed invention is "[a] sectional bowling lane."

We do not agree with the Examiner that this language can be ignored merely because it is in the preamble. For example, a claim reciting "[a]n airplane comprising a wheel with five spokes" would not be anticipated by a reference describing a car with a wheel having five spokes, despite the fact that the claim recites "airplane" only in the preamble.

We also do not agree with the Examiner that this language is merely a recitation of intended use. It may be true that a game of bowling can be played on virtually any horizontal surface. It may also be true that a bowling ball can be rolled across a floor composed of Gorges' panels (*see* FF 2-4). However, the Examiner has not provided any evidence showing that these facts would lead a person of ordinary skill to conclude that any horizontal surface can be considered a "bowling lane."

In contrast, as the Specification points out, a bowling lane has specific components, including "an approach, a ball track and a pin deck," each of which has distinct properties (Spec. 1; *see also* FF 12-16, below, various structural attributes of bowling lanes). Thus, a preponderance of the evidence supports Appellants' contention that a person of ordinary skill in the art would not have considered any horizontal surface capable of having a bowling ball rolled over it to be a bowling lane.

We therefore agree with Appellants that the Examiner's interpretation of "bowling lane" in claim 26 as encompassing the sectional floor disclosed by Gorges is not reasonable. Because the Examiner has not explained how Materials Science suggests the structure of a bowling lane, we reverse the Examiner's rejection of claim 26, and its dependent claim 27, as being obvious over Gorges and Materials Science.

We are not persuaded, however, that the Examiner erred in concluding that Gorges meets the limitations of claim 28. In contrast to claim 26, claim 28 recites "[a] construction element *for* a sectional bowling lane" (emphasis added). Thus, rather than reciting a specific assembly of elements recognizable to an ordinary artisan as being a particular thing or construct, claim 28 encompasses any structure that can be used to make the construct, in this case a sectional bowling lane. That is, claim 28 encompasses any product that is capable of performing the intended use, and which meets the other limitations in the claim.

As noted above, Gorges discloses structural panel elements that can be used, among other things, to construct floors (FF 2). As required by claim 28, Gorges' panels include a structural layer comprising a plurality of cells, in the shape of a honeycomb, the cells extending in a direction perpendicular to the face of the panel (FF 4).

With respect to the disputed limitations, we agree with the Examiner that the laminar face sheets 15 and 16 on opposite sides of the honeycomb core (*see* FF 4), and made of fibrous materials impregnated with a phenolic resin (FF 6), are encompassed by claim 28's "impact stress enduring board layer[s]." Claim 28 does not require the board layers to be made of any particular substance. Because they are essentially rigid sheets, we agree

with the Examiner that they can be considered board layers. Moreover, because they must endure the impact of being used as a floor, we agree with the Examiner that they can be considered “impact enduring.”

We also agree with the Examiner that the vinylidene fluoride/hexafluoropropene fire-retardant coating 20 (FF 5) on the laminar face sheet of Gorges’ panel (FF 4) meets claim 28’s limitation of “a bowling surface comprising at least one impact resistant laminate layer attached to the board layer on at least one side of the supporting structure layer.” As Appellants point out, laminating means “uniting superposed layers” (App. Br. 10).

While it may be described as a coating, the fire retardant copolymer is also a layer of superposed material united with the laminar face sheet 20 (*see* FF 4). Therefore, although the copolymer meets the definition of a coating, it also meets the definition of a “laminate layer” as recited in claim 28.

Moreover, given its use as part of flooring panel, we agree with the Examiner that it was reasonable to find that the fire retardant copolymer would provide at least some resistance to an object’s impact, which is all that claim 28 requires. Further, given Gorges’ disclosure that panels with differing strengths can be connected together to form an aircraft floor (FF 7), we also agree with the Examiner that Gorges’ panels meet the limitation requiring the construction element of claim 28 to be operatively connectable to at least one other construction element.

In sum, for reasons discussed above, we find that Gorges’ panels meet all of the limitations recited in the body of claim 28. Moreover, because the panels can be used to make floors, we agree with the Examiner that they are capable of performing the recited intended use.

Appellants' arguments do not persuade us that these findings are erroneous. Appellants point to no direct evidence demonstrating that Gorges' panels would be incapable of the intended use. Moreover, claim 28 does not recite any specific physical parameter describing the impact that the claimed element must endure or resist.

"It is well settled that 'anticipation is the epitome of obviousness.'" *In re McDaniel*, 293 F.3d 1379, 1385 (Fed. Cir. 2002) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

Because we find that Gorges' panels meet all of the limitations in claim 28, we also agree with the Examiner's conclusion that claim 28 would have been obvious to an ordinary artisan in view of Gorges. We therefore affirm the Examiner's rejection of claim 28 as being unpatentable over Gorges and Materials Science.

Because they were not argued separately, claims 12-17, 19-22, 24, and 25 fall with claim 28. *See* 37 C.F.R. § 41.37(c)(1)(vii).

With respect to claim 29, Appellants merely state what the claim recites (*see* App. Br. 8). This does not constitute a separate argument. *See* 37 C.F.R. § 41.37(c)(1)(vii) ("A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim."). Claim 29 therefore also falls with claim 28.

OBVIOUSNESS -- GORGES, MATERIALS SCIENCE, AND KELLY ISSUE

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gorges, Materials Science, and Kelly (Ans. 5-6). Claim 18 recites "[t]he construction element according to claim 28, wherein the laminate layer comprises at least one resin impregnated paper layer."

The Examiner concedes that “Gorges does not mention fibrous material and resin the use of paper for his layers. Kelly teaches that it would have been obvious to have used a paper impregnated with resin as a known board like material for use in creating laminates like that shown by Gorges” (Ans. 5-6). The Examiner further reasons that “[t]o have added a layer of resin impregnated paper to the panel element of Gorges would have clearly been obvious from the teachings of Kelly in order to increase the impact resistance of his panel” (*id.* at 11).

Appellants contend that the Examiner failed to make a *prima facie* case of obviousness because Gorges “does not suggest a bowling surface that is a laminate or a laminate that is impact resistant” (App. Br. 13). Moreover, Appellants argue, “Kelly does not suggest any of these features and also does not suggest a cellular board, impact stress enduring layer and impact laminate layer” (*id.*).

In view of the positions advanced by Appellants and the Examiner, the issue with respect to this rejection is whether the Examiner erred in concluding that an ordinary artisan would have considered it *prima facie* obvious to use Kelly’s impregnated paper resin on the surface of Gorges’ structural panels.

FINDINGS OF FACT

12. Kelly discloses “new and improved laminates” that provide “high impact resistant surfaces for bowling lanes” (Kelly, col. 1, ll. 7-10).

13. Kelly discloses that its laminates include “a core comprised of a plurality of alternating sheets of thermosetting resin impregnated glass cloth and thermosetting resin impregnated crepe paper” (*id.* at col. 3, ll. 33-35).

14. Kelly discloses that a 16 pound bowling ball dropped on this surface from three feet produces “no effect,” whereas dropping the same ball onto a polyurethane varnish and nitrocellulose lacquer finished wood bowling lane produced “a deep surface dent . . . and the wood fibers of the surface were torn” (*id.* at col. 3, l. 66 through col. 4, l. 2).

PRINCIPLES OF LAW

In *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), the Supreme Court rejected a “rigid approach” to the obviousness issue, and instead emphasized that “[t]hroughout this Court’s engagement with the question of obviousness, our cases have set forth an expansive and flexible approach” *Id.* at 415. The Court thus reasoned that the analysis under 35 U.S.C. § 103 “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418; *see also id.* at 421 (“A person of ordinary skill is . . . a person of ordinary creativity, not an automaton.”).

While it emphasized a flexible approach, the Court nonetheless also stressed that “a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* at 418. Rather, the Court stated:

[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements *in the way the claimed new invention does* . . . because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

Id. at 418-419 (emphasis added); *see also id.* at 418 (requiring a determination of “whether there was an apparent reason to combine the known elements *in the fashion claimed* by the patent at issue”) (emphasis added).

Ultimately, therefore, as our reviewing court has stated, “[i]n determining whether obviousness is established by combining the teachings of the prior art, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *In re GPAC Inc.*, 57 F.3d 1573, 1581 (Fed. Cir. 1995) (internal quotations omitted).

Moreover, as the Court advised in *KSR*, “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning *with some rational underpinning* to support the legal conclusion of obviousness.” *Id.* at 418 (quoting *In re Kahn*, 441 F.3d 977, 988, (Fed. Cir. 2006) (emphasis added).

ANALYSIS

We agree with Appellants that the Examiner erred in concluding that an ordinary artisan would have considered it *prima facie* obvious to use Kelly’s impregnated paper resin on the surface of Gorges’ structural panels. We note that Kelly discloses its laminates as imparting significant impact resistance to bowling lane surfaces (FF 12-14). However, the Examiner has not pointed to any evidence in any of the cited references suggesting that a person of ordinary skill in the art would have considered it desirable, or even suitable, to provide Gorges’ aircraft-floor-type structural panels with a surface intended for bowling alleys.

Nor is there any suggestion in Gorges that its panels lack sufficient impact resistance to perform their intended functions. Rather, Gorges

suggests that the load bearing resistance of its panels can be adjusted to accommodate the amount of traffic it is expected to receive (*see* FF 7).

We therefore agree with Appellants that the Examiner did not make out a *prima facie* case of obviousness with respect to claim 18, and reverse the rejection of that claim as being obvious over Gorges, Materials Science, and Kelly.

OBVIOUSNESS -- BRUNST AND KELLY

Claims 17-22 and 24-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst and Kelly (Ans. 6).

The Examiner cites Brunst as disclosing “a substructure of beams in fig. 1 [with] construction elements having a cellular board 21 where all wood material is considered to be a ‘cellular material’ to meet the limitations of the claim[s]” (*id.*). The Examiner states it is “unclear whether or not Brunst shows a protective layer from his (col. 6, lns. 50-59). In any event, Kelly teaches that protective layers attached to a substrate are known. To have added the protective layer of Kelly to Brunst would have been obvious in order to make the panel more durable” (*id.*).

Appellants contend, among other things, that the cited references do not “suggest a board layer or a cellular structure” (App. Br. 13).

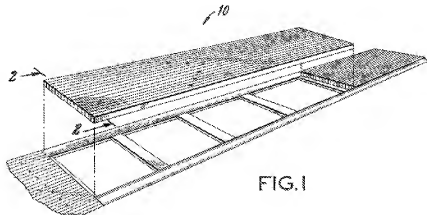
The Examiner responds that Brunst “meets the language of claims 26, 28 and 29 where they recite a ‘cellular board including a plurality of cells, each cell including a plurality of walls substantially tra[n]sverse to the supporting structure’” (Ans. 12). Specifically, the Examiner states that Brunst’s Figure 2 was interpreted “to show a cellular board 20 of wood that has a plurality of cells 21 including a plurality of walls as shown by the lines in fig. 2 in between each adjacent cell 21” (*id.*).

In view of the positions advanced by Appellants and the Examiner, the issue with respect to this rejection is whether the Examiner erred in finding that Brunst meets the limitation in claims 26, 28, and 29, requiring the claimed structures to have a cellular board.

FINDINGS OF FACT

15. Brunst discloses “a composite panel member having a decorative laminate surface thereon. The panel may be used to replace a portion of an existing bowling lane or to construct an entire synthetic surface bowling lane” (Brunst, col. 1, ll. 8-11).

16. Figure 1 of Brunst is reproduced below:



Brunst’s Figure 1 shows “a perspective view illustrating the composite panel member of the subject invention prior to its installation to a portion of a bowling lane” (*id.* at col. 4, ll. 29-31).

17. Figure 2 of Brunst, reproduced below, “is a cross-sectional view of the composite panel member of the subject invention taken along line 2-2 of FIG. 1” (*id.* at col. 4, ll. 32-34):

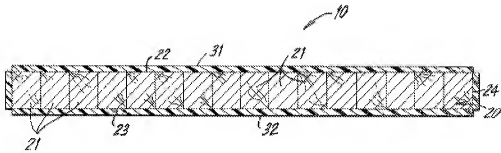


FIG. 2

Figure 2 shows composite panel 10, which includes “a wooden core member 20 . . . [which] is formed from a plurality of wood strip portions 21, which are firmly connected to one another. In the preferred embodiment of the present invention, wood strips 21 are glued to one another” (*id.* at col. 4, ll. 59-66).

18. Also seen in Figure 2 are laminate members 31 and 32, “which form a part of the subject panel member 10 [and] typically comprise a thermosetting resin impregnated core overlaid with a protective thermosetting resin impregnated paper overlay or a thermosetting resin overlay coating” (*id.* at col. 5, ll. 33-37). Additionally, “laminate 31 which is adhered to the top face 22 of core 20 includes a decorative layer or print sheet disposed between the resin impregnated core and the protective overlay, said print sheet having the customary bowling lane indicia such as wood grain, marker darts, etc.” (*id.* at col. 5, ll. 38-41.)

PRINCIPLES OF LAW

“[O]bviousness requires a suggestion of all limitations in a claim.” *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (citing *In re Royka*, 490 F.2d 981, 985 (CCPA 1974)); *see also KSR*, 550 U.S. at 418 (requiring a determination of “whether there was an apparent

reason to combine the known elements *in the fashion claimed* by the patent at issue”) (emphasis added).

ANALYSIS

We agree with Appellants that the Examiner erred in finding that Brunst meets the limitations in claims 26, 28, and 29, requiring the claimed structures to have a cellular board. The Examiner urges that the items 21 in Figure 2 of Brunst are a plurality of cells, as required by the claims (Ans. 12).

However, the items designated 21 in Brunst’s Figure 2 are described as being “wood strip portions . . . , which are firmly connected to one another,” for example using glue (Brunst, col. 4, ll. 64-66). We do not agree with the Examiner that wood strips can reasonably be considered cells.

We therefore also do not agree with the Examiner that Brunst meets the limitations in claims 26, 28, and 29, requiring the claimed structures to include a cellular board, and accordingly reverse the Examiner’s rejection of those claims, and their dependent claims 17-22, 24, 25, and 27 as being obvious in view of Brunst and Kelly.

OBVIOUSNESS --

BRUNST, KELLY, STIRLING, MATERIALS SCIENCE, AND TURNER

Claims 12-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst, Kelly, Stirling, Materials Science, and Turner (Ans. 6-7).

Claim 13 is representative of the rejected claims and recites “[t]he construction element according to claim 28, wherein the cells have a regular hexagonal cross-section.”

The Examiner concedes that “Brunst does not mention cells having a hexagonal cross-section” (Ans. 6). The Examiner notes, however, that “Sterling teaches in bowling lanes that ‘sandwich-type’ structures are known in to be tried in bowling. From the bottom of pg. 541 of Materials Science one can see that ‘honeycomb’ structure is a well known to ‘sandwich panels’” (*id.*).

The Examiner further notes that “Turner teaches that it is known to design honeycomb panels such that they are resistant to impact loads” (*id.* at 7). Based on the references’ teachings, the Examiner concludes that “[t]o have replaced the panels of Brunst with the honeycomb panels of Materials Science would have been an obvious matter of replacing one known sandwich type panel for that of another in order to take advantage of its known properties of strength, lightness, rigidity and stability” (*id.* at 6-7).

Appellants contend that Stirling and Turner fail to overcome the previously argued deficiencies of Brunst and Kelly because Stirling merely discloses a resurfacing layer that is screwed into the surface of an existing bowling lane, and because Turner’s honeycomb structures are used to make aircraft floors, and are therefore not designed to withstand the repeated

impacts experienced by bowling lanes (App. Br. 16-17). Appellants contend that the Examiner fails to provide sufficient details as to how the various elements of the references are to be combined, urging that “the present invention is not just honeycomb panels intended for use in a bowling lane. The present invention is a multilayer structure that includes as one of the layers a honeycomb panel. However, the present invention also includes other layers” (*id.* at 17).

Appellants further contend that “[i]t is known buckling and warpage effects can occur in connection with honeycomb structures. These buckling and warpage effects are highly undesirable features in the construction element for a bowling lane” (*id.* at 18). Moreover, Appellants argue, honeycomb structures are known to be vulnerable to impact (*id.* (citing R.R. Aitken et al., *The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body*, SYMPOSIUM ON RECENT DEVELOPMENTS IN THE STUDY OF IMPACTS ON COMPOSITE MATERIALS (Virginia Polytechnic Institute and State University, Blacksburg, VA June 27-30, 1999))).

Given these structural vulnerabilities, and the stringency of bowling rules directed to lanes’ structural requirements, Appellants argue that “it would not have been obvious at the time the present invention was made to employ cellular structures in a bowling lane. It follows that it would not be obvious to combine the references in the manner asserted the by [sic] Examiner” (*id.* at 19).

In view of the positions advanced by Appellants and the Examiner, the issue with respect to this rejection is whether the Examiner erred in concluding that an ordinary artisan would have considered it *prima facie* obvious to use a cellular board in which the cells have a regular hexagonal

cross-section, or a honeycomb structure, as a construction element in a bowling lane.

FINDINGS OF FACT

19. Stirling discloses that prior art attempts at resurfacing bowling lanes included a “factorymade, thin sandwich-type overlay structure and mechanically anchoring the structure to the lane at considerably spaced locations, such as on the order of four feet apart. The sandwich would include a particle board covered by a synthetic laminate made in the factory and taken to a [s]ite for installation” (Stirling, col. 1, ll. 53-58). However, “[s]uch sandwich structures would not stay flat and buckled between the anchoring locations” (*id.* at col. 1, ll. 58-60).

20. In response to the prior art shortcomings for resurfacing bowling lanes, Stirling discloses “a relatively thick, homogeneous laminate sheet. A plurality of mechanical fastening means are spaced about the perimeter of the sheet in respective recesses in the upper surface of the sheet and extending through the sheet for securement to the lane” (*id.* at col. 2, ll. 21-26).

21. Stirling’s laminate sheet also includes an outer wood-simulating print layer and a clear wear layer (*id.* at col. 3, ll. 34-38).

22. Turner discloses “a cellular structural material . . . having a high-density honeycomb core adjacent a low-density honeycomb core” (Turner, col. 1, ll. 6-9).

23. Turner discloses:

In some applications, such as for flooring, a honeycomb panel can be expected to receive stress from compressive bending, dropping of objects, and the like. Decking on mobile or fixed bridges is an application which typically involves

impact loading plus high bending loads. Applications such as aircraft flooring panels must be extremely lightweight, such as 1 lb./ft² (about 5 kg/m²), yet must tolerate drop impacts. Leading edges of airfoils and other exposed sections of a rapidly moving structure can experience high-impact loads upon collision with small objects.

(*Id.* at col. 1, ll. 19-30.)

24. Turner discloses that with “a traditional honeycomb configuration, resistance to impact or bending stress damage is achieved by increasing the thickness of the outer skin, increasing the density of the honeycomb, or adding a stringer or hat section to reinforce the outer skin” (*id.* at col. 1, ll. 31-35).

25. In contrast to traditional methods of rendering honeycomb panels impact-resistant, Turner discloses that its two-core panels “provide[] for producing a structure which is hardened to reduce or resist damage from flying objects, from drop-impacts, and from bending stress, without a substantial weight penalty” (*id.* at col. 5, ll. 30-34).

26. Aitken discloses that “[d]ue to their high stiffness and strength ratios, composite sandwiches have been used increasingly in aerospace applications. The main drawback of these sandwich components is their relatively low resistance to impact damage and the amount by which their strength is reduced under compressive loading after such impact damage” (App. Br. 30 (Evidence Appendix)).

27. Aitken discloses that “[t]o examine the impact damage formation of the composite sandwich, a series of high velocity impacts (greater than 100 kph) have been performed on Nomex honeycomb cored sandwich utilizing a thin (0.5 mm) glass fiber/epoxy facesheet” (*id.*).

Aitken states that the “impacts were performed with a pneumatic device launching a soft projectile 100-mm in diameter. The damage formed from this large contact area type event was seen to be large in plan area but shallow manifesting itself primarily as crushing of the sandwich core” (*id.*).

PRINCIPLES OF LAW

As noted above, despite emphasizing the importance of flexibility in the obviousness analysis, in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), the Supreme Court also noted the importance of identifying “a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *Id.* at 418.

Applying these concepts, the Court ultimately reaffirmed, however, “that when a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *Id.* at 417 (quoting *Sakraida v. AG Pro, Inc.*, 425 U.S. 273 (1976)).

Thus, as the Court stated, “when the question is whether a patent claiming the combination of elements of prior art is obvious,” the relevant inquiry is “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.*

ANALYSIS

Appellants’ arguments do not persuade us that the Examiner erred in concluding that an ordinary artisan would have considered it *prima facie* obvious to use a cellular board in which the cells have a regular hexagonal cross-section, or a honeycomb structure, as a construction element in a bowling lane.

It may be true, as Aitken describes, that certain types of honeycomb panels are susceptible to impact damage (FF 26, 27). However, Appellants' claims are not limited to honeycomb panels constructed of materials that an ordinary artisan would expect to be unsuitable for making bowling lanes. Rather, Appellants' claims encompass panels made from materials capable of withstanding impacts.

As noted above, Turner discloses that a variety of methods, including increasing outer layer strength and using a two-core construction, can be used to successfully render honeycomb panels resistant to impacts (FF 24, 25). We are therefore not persuaded that a person of ordinary skill in the art would have considered honeycomb panels to be unsuitable for use as the flooring component of a bowling lane.

Rather, given Brunst's disclosure of the suitability of using sectional panels to make bowling lanes, and given the disclosures in Materials Science and Turner of the suitability of honeycomb panels to make floors, combined with Turner's disclosure that honeycomb panels can be made impact resistant when configured appropriately, we agree with the Examiner that an ordinary artisan would have considered it obvious to substitute honeycomb panels having a bowling-suitable surface for Brunst's sectional panels. Moreover, as the Examiner points out, Stirling suggests that sandwich type materials are amenable for use as bowling lane surfaces.

Thus, we are not persuaded that the Examiner failed to make a *prima facie* case of obviousness with respect to claim 13. We therefore affirm the Examiner's rejection of that claim as being obvious in view of Brunst, Kelly, Stirling, Materials Science, and Turner. Claims 12 and 14 fall with claim 13. *See* 37 C.F.R. § 41.37(c)(1)(vii).

OBVIOUSNESS --

BRUNST, KELLY, STIRLING, MATERIALS SCIENCE, AND GORGES
ISSUE

Claims 15 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst, Kelly, Stirling, Materials Science, and Gorges (Ans. 7). Claims 15 and 16 read as follows:

15. The construction element according to claim 28, further comprising a cell filling material.

16. The construction element according to claim 15, wherein the cell filling material comprises polyurethane.

The Examiner finds that to “have replaced the panel of Brunst with one constructed of honeycomb would have been obvious for the reasons set forth above. To have filled these cells of the honeycomb panel with a polyurethane foam would have been obvious as taught by Gorges at his 21 in order to insulate the panel” (Ans. 7).

Appellants contend that “Gorges suggests an aircraft panel that includes foam fillers in the honeycomb cells spaces. Such an aircraft panel does not suggest a bowling lane or any of the elements of the bowling lane not suggested by any of the other cited references” (App. Br. 21).

The Examiner responds that “[c]learly one considering designing a panel for use in a bowling alley would consider the teachings of Gorges and desire to ‘insulate’ the panel to quiet it in it[s] intended environment” (Ans. 16).

Claim 15 is representative of the rejected claims. Thus, in view of the positions advanced by Appellants and the Examiner, the issue with respect to this rejection is whether the Examiner erred in concluding that an ordinary

artisan would have considered it obvious to use a cellular board in which the cells contain filling material as a construction element in a bowling lane.

FINDINGS OF FACT

28. As noted above, Gorges discloses cellular panels “which are particularly, but not exclusively, suitable for use as interior floor and/or bulkhead panels in aircraft--especially, commercial aircraft--ships, submarines and the like” (Gorges, col. 3, ll. 43-47).

29. Gorges discloses that the honeycomb core of its panels can contain a foam filler “either throughout all of the nodules or cells . . . in any given panel or, if desired, throughout only a localized region of nodules or cells” (*id.* at col. 7, ll. 18-20).

30. Gorges states that the foam filler “not only further enhances the fire resistance characteristics of the panel . . . but, in addition, the foam has proven to provide appreciable insulating properties both in terms of heat insulation and in terms of sound insulation” (*id.* at col. 7, ll. 25-29).

ANALYSIS

Appellants’ arguments do not persuade us that the Examiner erred in concluding that an ordinary artisan would have considered it obvious to use a cellular board in which the cells contain filling material as a construction element in a bowling lane, as required by claim 15.

Given Brunst’s disclosure of the suitability of using sectional panels to make bowling lanes, and given the disclosure in Materials Science that honeycomb panels are suitable for making floors of buildings, we agree with the Examiner that an ordinary artisan would have considered it obvious to substitute honeycomb panels with a bowling-suitable surface for Brunst’s sectional panels. Moreover, given the advantages, including sound

deadening, of including a foam material in the cells of a honeycomb panel (*see* FF 30), we further agree that an ordinary artisan would have been prompted to include such material in the cells of a panel used to make a bowling lane.

We note Appellants' arguments that the claims recite advantages over known bowling lane construction elements (App. Br. 22-23). However, the claims do not recite any specific empirical limitations regarding the weight of the construction elements or their impact resistance. Nor have Appellants presented any specific evidence that the claimed structures have any properties that would have been unexpected when compared to the structures in the prior art cited by the Examiner.

Because Appellants' arguments do not persuade us that the Examiner failed to make a *prima facie* case of obviousness with respect to claim 15, we affirm the Examiner's rejection of that claim as being obvious in view of Brunst, Kelly, Stirling, Materials Science, and Gorges. Claim 16 falls with claim 15. *See* 37 C.F.R. § 41.37(c)(1)(vii).

SUMMARY

We affirm the Examiner's rejection of claims 12-17, 19-22, 24, 25, 28, and 29 under 35 U.S.C. § 103(a) as being unpatentable over Gorges and Materials Science.

However, we reverse the Examiner's rejection of claim 26 as being unpatentable over Gorges and Materials Science.

We also reverse the Examiner's rejection of claim 18 under 35 U.S.C. § 103(a) as being unpatentable over Gorges, Materials Science, and Kelly.

We also reverse the Examiner's rejection of claims 17-22 and 24-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brunst and Kelly.

However, we affirm the Examiner's rejection of claims 12-14 under 35 U.S.C. § 103(a) as being unpatentable over Brunst, Kelly, Stirling, Materials Science, and Turner.

We also affirm the Examiner's rejection of claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Brunst, Kelly, Stirling, Materials Science, and Gorges.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

Ssc:

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